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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,299	08/21/2001	William H. Thesling	74448/12102	8290

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EXAMINER	
MEEK, JACOB M	

ART UNIT	PAPER NUMBER
2637	

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/934,299	THESLING ET AL.	
	Examiner	Art Unit	
	Jacob Meek	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 93* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,8,11,16-22,24,26,29,34-38,40,44-49,57-62,64,66,69,74-80,82,84,88 and 91-93* is/are rejected.

7)☒ Claim(s) *5,7,9,10,12-15,23,25,27,78,30-33,39,41-43,50-56,63,65,67,68,70-73,81,83,85-87,89,90* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 38 is objected to because of the following informalities: Claim 38 (method) claims dependency from claim 34 (apparatus). This claim will be interpreted as being dependent on claim 37. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 – 4, 6, 8, 11, 16 – 22, 24, 26, 29, 34 - 38, 40, 44 – 49, 57 – 62, 64, 66, 69, and 74 - 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Lantremange (US Patent 6,155,433) in view of Gatherer (US Patent 6,560,294).

With regard to claim 1, de Lantremange teaches a method for processing information from a data link (see column 1, lines 49 – 51) compromising the steps of receiving a sampled waveform (see Figure 1A, 20, 21, 24 and column 5, line 60 – column 6, line 5), determining symbol phase (see figure 1B, 40 and column 3, lines 48 – 56), processing waveform to remove carrier signal (see figure 1B, 52 and column 3, lines 48 – 56 where this is interpreted as equivalent functionality), calculating phase ambiguity of data (see column 3, lines 28- 39 where is estimation is interpreted as equivalent functionality), and indexing an arrival time of data information (see column 3, lines 15 – 27 where analyzing is interpreted as providing equivalent functionality). de Lantremange is silent with respect to data information being of burst characteristic. Gatherer teaches that data information has a bursty nature (see Figure 3

and column 6, lines 38 – 45 where it would be inherent for demodulator to provide reciprocal functionality). It would have been obvious to one of ordinary skill in the art at the time of invention to provide burst information handling as described by Gatherer in de Lantremange's method in order to facilitate the implementation of a high-speed data link.

With regard to claim 2, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including maximized square symbol amplitude functionality.

With regard to claim 3, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including maximized symbol amplitude functionality.

With regard to claim 4, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including minimized symbol variance functionality.

With regard to claim 6, de Lantremange teaches a method where phase and frequency are estimated prior to carrier signal (see column 1, line 56 – column 2, line 11 where this is interpreted as providing equivalent functionality).

With regard to claim 8, de Lantremange teaches a method that utilizes an FFT on a block of symbols (see Column 6, lines 6 – 14 for block size, and column 6 lines 26 – 44 where the polyphase filter disclosed is interpreted as including FFT functionality).

With regard to claim 11, de Lantremange teaches a method of blind equalization (see column 8, lines 54 – 67) where blind equalization is based on the identification of a unique bit pattern.

With regard to claim 16, de Lantremange is silent with respect to his method being used in a MF-TDMA structure. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58) of which TDMA is a known subset. It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claim 17, de Lantremange is method with respect to his invention being used for receiving a carrier signal transmitted wirelessly. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58). It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claim 18, de Lantremange is method with respect to his invention being used for receiving a carrier signal transmitted wirelessly in a satellite link. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58) of which satellite communications are a subset. It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claims 19 – 22, 24, 29, 34 – 36 the claimed apparatus is nothing more than the restating of the embodiment of the method of claims 1 –4, 6, 8, 11, 16 – 18, respectively.

With regard to claim 37, de Lantremange teaches a method for processing information in a data link compromising the steps of receiving a sampled waveform containing symbols imposed on a carrier signal (see figure 1A, 10, 20, 24 and column 1, line 59 – column 2, line 11), determining symbol timing (see column 2, lines 5 – 7) utilizing one or more metrics (see column 2, lines 55 – 59), processing sampled waveform to remove carrier signal by estimating residual carrier phase and frequency (see figure 1B, 50, 52, 54, 44 and column 3, lines 48 – 56), and down converting to remove carrier signal (see figure 1B, 50 and column 22, lines 41 – 50), and determining phase ambiguity and arrival time (see column 1 line 59 – column 2, line 11). de Lantremange is silent with respect to data information being of burst characteristic. Gatherer teaches that data information has a bursty nature (see Figure 3 and column 6, lines 38 – 45 where it would be inherent for demodulator to provide reciprocal functionality). It would have been obvious to one of ordinary skill in the art at the time of invention to provide burst information handling as described by Gatherer in de Lantremange's method in order to facilitate the implementation of a high-speed data link.

With regard to claim 38, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including maximized symbol amplitude, maximized square symbol amplitude, and minimized symbol variance functionality.

With regard to claim 40, de Lantremange teaches a method that utilizes an FFT on a block of symbols (see Column 6, lines 6 – 14 for block size, and column 6 lines 26 – 44 where the polyphase filter disclosed is interpreted as including FFT functionality).

With regard to claim 44, de Lantremange teaches a method of blind equalization (see column 8, lines 54 – 67) where blind equalization is based on the identification of a unique bit pattern.

With regard to claim 45, de Lantremange is silent with respect to his method being used in a MF-TDMA structure. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58) of which TDMA is a known subset. It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claim 46, de Lantremange is method with respect to his invention being used for receiving a carrier signal transmitted wirelessly. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58). It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claim 47, de Lantremange is method with respect to his invention being used for receiving a carrier signal transmitted wirelessly in a satellite link. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58) of which satellite communications are a subset. It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claims 48, 49, 57, and 58, the claimed apparatus is nothing more than the restating of the embodiment of the method of claims 37, 38, 46, and 47, respectively.

With regard to claim 59, de Lantremange teaches a method for processing information in a data link compromising the steps of receiving a sampled waveform containing symbols imposed on a carrier signal (see figure 1A, 10, 20, 24 and column 1, line 59 – column 2, line 11), determining symbol timing (see column 2, lines 5 – 7) utilizing one or more metrics (see column 2, lines 55 – 59), processing sampled waveform in phase and frequency to remove carrier signal (see figure 1B, 50, 52, 54, 44 and column 3, lines 48 – 56 and see figure 1B, 50 and column 22, lines 41 – 50), and determining phase ambiguity and arrival time (see column 1 line 59 – column 2, line 11). de Lantremange is silent with respect to data information being of burst characteristic. Gatherer teaches that data information has a bursty nature (see Figure 3 and column 6, lines 38 – 45 where it would be inherent for demodulator to provide reciprocal functionality). It would have been obvious to one of ordinary skill in the art at the time of invention to provide burst information handling as described by Gatherer in de Lantremange's method in order to facilitate the implementation of a high-speed data link.

With regard to claim 60, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including maximized square symbol amplitude functionality.

With regard to claim 61, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including maximized symbol amplitude functionality.

With regard to claim 62, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including minimized symbol variance functionality.

With regard to claim 64, de Lantremange teaches a method where phase and frequency are estimated prior to carrier signal (see column 1, line 56 – column 2, line 11 where this is interpreted as providing equivalent functionality).

With regard to claim 66, de Lantremange teaches a method that utilizes an FFT on a block of symbols (see Column 6, lines 6 – 14 for block size, and column 6 lines 26 – 44 where the polyphase filter disclosed is interpreted as including FFT functionality).

With regard to claim 69, de Lantremange teaches a method of blind equalization (see column 8, lines 54 – 67) where blind equalization is based on the identification of a unique bit pattern.

With regard to claim 74, de Lantremange is silent with respect to his method being used in a MF-TDMA structure. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58) of which TDMA is a known subset. It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claim 75, de Lantremange is method with respect to his invention being used for receiving a carrier signal transmitted wirelessly. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58). It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless

functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claim 76, de Lantremange is method with respect to his invention being used for receiving a carrier signal transmitted wirelessly in a satellite link. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58) of which satellite communications are a subset. It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

3. Claims 77 – 80, 82, 84, 88, 91 - 93 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Lantremange (US Patent 6,155,433) in view of Gatherer (US Patent 6,560,294) in further view of Gu et al (US Patent 6,421,380).

With regard to claim 77, de Lantremange teaches a method for processing information in a data link compromising the steps of receiving a sampled waveform containing symbols imposed on a carrier signal (see figure 1A, 10, 20, 24 and column 1, line 59 – column 2, line 11), determining symbol timing (see column 2, lines 5 – 7) utilizing one or more metrics (see column 2, lines 55 – 59), processing sampled waveform to remove carrier signal (see figure 1B, 50, 52, 54, 44 and column 3, lines 48 – 56 and see figure 1B, 50 and column 22, lines 41 – 50), and determining phase ambiguity and arrival time (see column 1 line 59 – column 2, line 11). de Lantremange is silent with respect to data information being of burst characteristic. Gatherer teaches that data information has a bursty nature (see Figure 3 and column 6, lines 38 – 45 where it would be inherent for demodulator to provide reciprocal functionality). It would have been obvious to one of ordinary skill in the art at the time of invention to provide burst information handling as described by Gatherer in de Lantremange's

method in order to facilitate the implementation of a high-speed data link. de Lantremange and Gatherer are silent with respect to midamble detection used to calculate phase ambiguity and arrival times. Gu discloses that midamble is used for synchronization (see column 3, lines 28 – 40) and is used for signal calculations (see column 4, lines 19 – 47 where this is interpreted as equivalent functionality). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the midamble circuit of Gu in the invention of de Lantremange in view of Gatherer to produce a device to allow for the accurate determination of channel characteristics (Gu, '380 column 2, lines 1 – 15).

With regard to claim 78, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including maximized square symbol amplitude functionality.

With regard to claim 79 de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including maximized symbol amplitude functionality.

With regard to claim 80, de Lantremange teaches a method utilizing multiple algorithms for the determination of metrics (see column 2, lines 5 – column 3, line 2 and Figure 1A, 32 and Figure 1B, 48)) where this is interpreted as including minimized symbol variance functionality.

With regard to claim 82, de Lantremange teaches a method where phase and frequency are estimated prior to carrier signal (see column 1, line 56 – column 2, line 11 where this is interpreted as providing equivalent functionality).

With regard to claim 84, de Lantremange teaches a method that utilizes an FFT on a block of symbols (see Column 6, lines 6 – 14 for block size, and column 6 lines 26 – 44 where the polyphase filter disclosed is interpreted as including FFT functionality).

With regard to claim 88, de Lantremange teaches a method of blind equalization (see column 8, lines 54 – 67 where blind equalization is based on the correlation of a unique bit pattern, and selection of best correlation of but pattern).

With regard to claim 91, de Lantremange is silent with respect to his method being used in a MF-TDMA structure. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58) of which TDMA is a known subset. It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claim 92, de Lantremange is method with respect to his invention being used for receiving a carrier signal transmitted wirelessly. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58). It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

With regard to claim 93, de Lantremange is method with respect to his invention being used for receiving a carrier signal transmitted wirelessly in a satellite link. Gatherer teaches that his invention is also suited for use in wireless communications (see column 5, lines 50 – 58) of which satellite communications are a subset. It would have been obvious to one of ordinary skill in the art at the time of invention to provide wireless functionality as described

by Gatherer in de Lantremange's method in order to facilitate the implementation of an efficient adaptive equalizer for wireless data communications.

Allowable Subject Matter

4. Claims 5, 7, 9, 10, 12 –15, 23, 25, 27,28,29, 30 – 33, 39,41 – 43, 50 –56, 63,65,67,68,70-73,81,83,85-87,89 and 90 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other Cited Prior Art

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kingston (US Patent 6,201,843), Butash (US Patent 6,091,704), Harrison (US Patent 5,323,391) and Chennakeshu (US Patent 5,249,205) disclose adaptive equalizers in related field of invention. NPL references (Dengwei Fu, Fast Synchronizer; Yimin Jiang, VLSI Implemented ML; Luise, M., Carrier Frequency Recovery) disclose techniques for techniques for carrier frequency and phase recovery.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Meek whose telephone number is (571)272-3013. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571)272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMM

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